DSC-Electronics
Professional laboratory equipment

DP-S Series REV:2 AC/DC Laboratory Power Supply
User's Manual V3.2

Version 03.11.2015

1. Use of Operation Manual

Please read through and understand this Operation Manual before operating the product. After reading, always keep the manual nearby so that you may refer to it as needed. When moving the product to another location, be sure to bring the manual as well.

Calibration notification

We notify that the instruments included in this manual are in compliance with the features and specifications as stated in this manual. Before shipment, the instrument has been calibrated in factory. The calibration procedures and standards are compliant to the national regulations and standards for electronic calibration.

Warranty

We guarantee that the instrument has been passed strict quality check. We warrant our instrument’s mainframe and accessories in materials within the warranty period of one year. We guarantee the free spare parts for products which are approved defective in this period. To get repair service, please contact with your nearest sales and service office. We do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hinted guarantee items related to tradable characteristics and any particular purpose. We will not take any responsibility in cases regarding to indirect, particular and ensuing damage, such as modifications to the circuit and functions by the users, repairing or component replacement by the users, or damage during transportation.

For product improvement, the specifications are subject to change without prior notice.

1.1 Safety Instructions

This chapter contains important safety instructions that you must follow when operating the instrument and when keeping it in storage. Read the following before any operation to insure your safety and to keep the best condition for the instrument.

Safety Symbols

The following safety symbols may appear in this manual or on the instrument:

	WARNING	Identifies conditions or practices that could result in injury or loss of life.
	CAUTION	Identifies conditions or practices that could result in damage to the instrument or to other properties.
	DANGER	High voltage
	ATTENTION	Refer to the manual
		Protective conductor terminal
		Earth (Ground) terminal

1.2 Safety Guidelines

General 	● The power supply can be used only by qualified personnel. ● Do not connect any load to the power supply before it's turned on. Make sure to disconnect the load before shutting down the power supply. Not following this instruction may cause damages to the power supply which are not under warranty. ● Before turning on the power supply, make sure the chassis are properly grounded. Removing grounding or improper GND terminal connection may cause electrical shock. ● Do not use this power supply on life support system or other systems with similar requirements. ● Do not use this power supply near water. ● Do not operate or touch this power supply with wet hands. ● Do not open the casing of the power supply when it is connected to AC mains. ● The max. output voltage of the power supply may be over 60VDC, never touch the metal contact parts of the output terminals while the output is ON. ● Do not use the power supply in an atmosphere which contains sulfuric acid mist or other substances which cause corrosion to metal. ● Do not use the power supply in a dusty place or a highly humid place as such will cause power supply reliability degradation and instrument failures. ● Install the power supply in a place free from vibration. ● Install the power supply in a place with ambient temperature in range of -10~70 degree celsius. Note that the power supply operation may become unstable if it is operated in an ambient temperature exceeding the range of 0~40 degree Celsius. ● If you are running inductive load like magnetic coils, DC motors etc. make sure to change the voltage/current slowly, and NEVER turn the power supply on or off with an inductive load connected.
Power supply 	**AC input voltage**: refer to input label on rear panel. Connect the protective grounding conductor of the AC power cord to an earth ground to avoid electrical shock.
Fuse 	● The DP-S series are protected with an automatic fuse, which has to be reset by DSC-Electronics. Please contact our support.

2. General Knowledge

The DP-S power supply can supply voltage and current in constant voltage (CV) or constant current (CC) mode within the rated output range. This allows continuous switching from constant current to constant voltage modes in response to the load change.

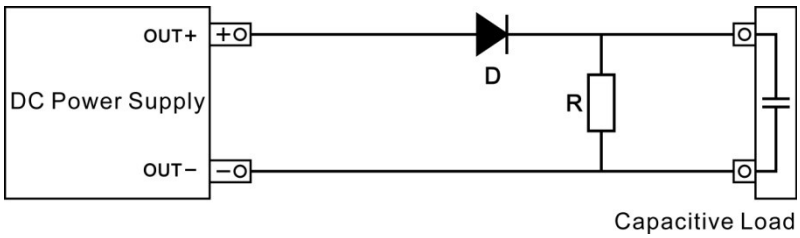
In CV mode, a regulated output voltage is provided. The output voltage remains constant as the load increases while the output current changes in response to the load changes, until the preset current limit point is reached. At that point, the output current becomes constant and the output voltage drops in proportion to the further increases in load. The pint is indicated by the front panel LED indicators.

Similarly in CC mode switching from CC to CV mode automatically occurs from a decrease of the load. A regulated output current is provided. The output current remains constant as the load decreases while the output voltage changes in response to the load changes.

2.1 Application of Capacitive Load

If the power supply is connected to a big capacitive load, it always causes interferences to the output voltage in a power supply.

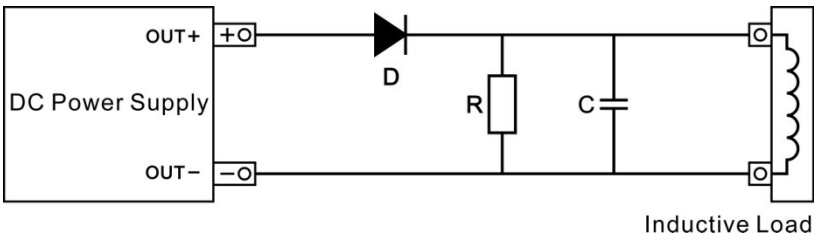
To solve this problem, connect a power resistor in parallel to the output terminals of the power supply. At the same time, connect a diode in serial between output terminals and the load.



2.2 Application of Inductive Load

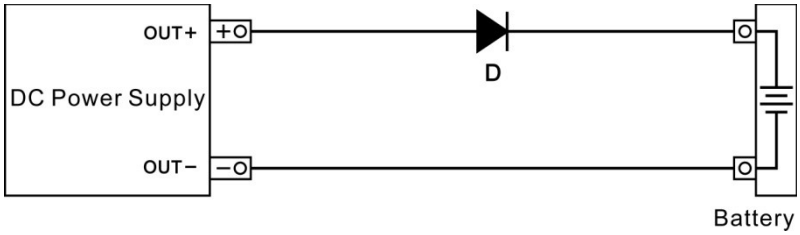
If an inductive load is connected to the power supply, it will cause a reverse polarity induction electric impulse when the power supply is turned on or off, or when changing the output voltage / polarity. The pulse caused by an inductive load will also affect the power supply, especially when the pulse has the same polarity with the output of power supply.

To avoid effect or damage to the power supply, connect a diode in serial between the output terminals of power supply and the load. At the same time, connect a power resistor and a capacitor in parallel to the load to make an R-C filter circuit, which will significantly decrease generation of the impulse.



2.3 Application of Battery Load

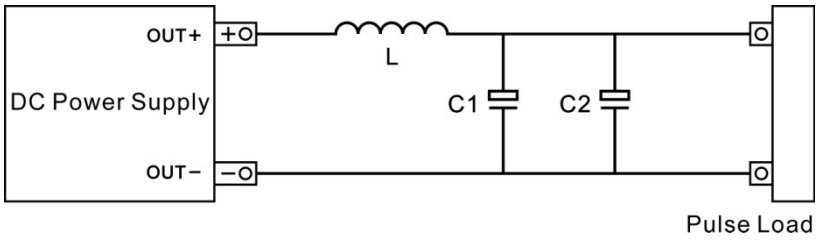
If using the DP-S for charging a battery, it is recommended to connect a diode between the power supply and the battery.



2.4 Application of Pulse Load

If the peak current of a pulse load such as motor, bulb, DC-DC or DC-AC converter module is nearly the rated current of the power supply, it can cause voltage drop or instability to the output.

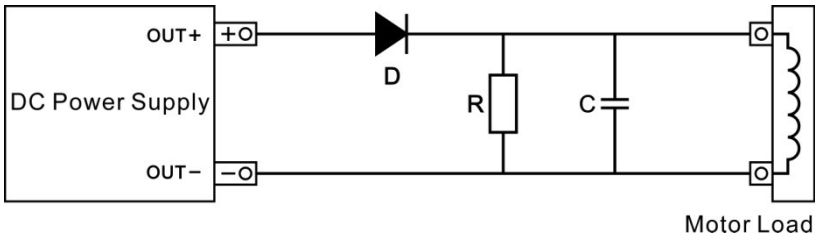
A basic solution is to connect an inductor in serial between the power supply and the load.
If the pulse circuit has a small pulse width or low peak current, another solution is to additionally connect a capacitor with large capacity. A reference for choosing the capacity of a capacitor is: 1000uF capacity to 1A current.



2.5 Application of Load with Reverse Polarity Current

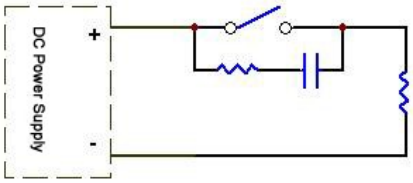
If the power supply is connected to a load that can cause reverse polarity current to the power supply output, the output voltage will become unstable.

A solution is to connect a diode in serial between the output terminal and the load. At the same time, connect a discharge resistor in parallel to the load. If the reverse polarity current is a peak surge, connect an electrolytic capacitor in parallel to the load.



2.6 Switch

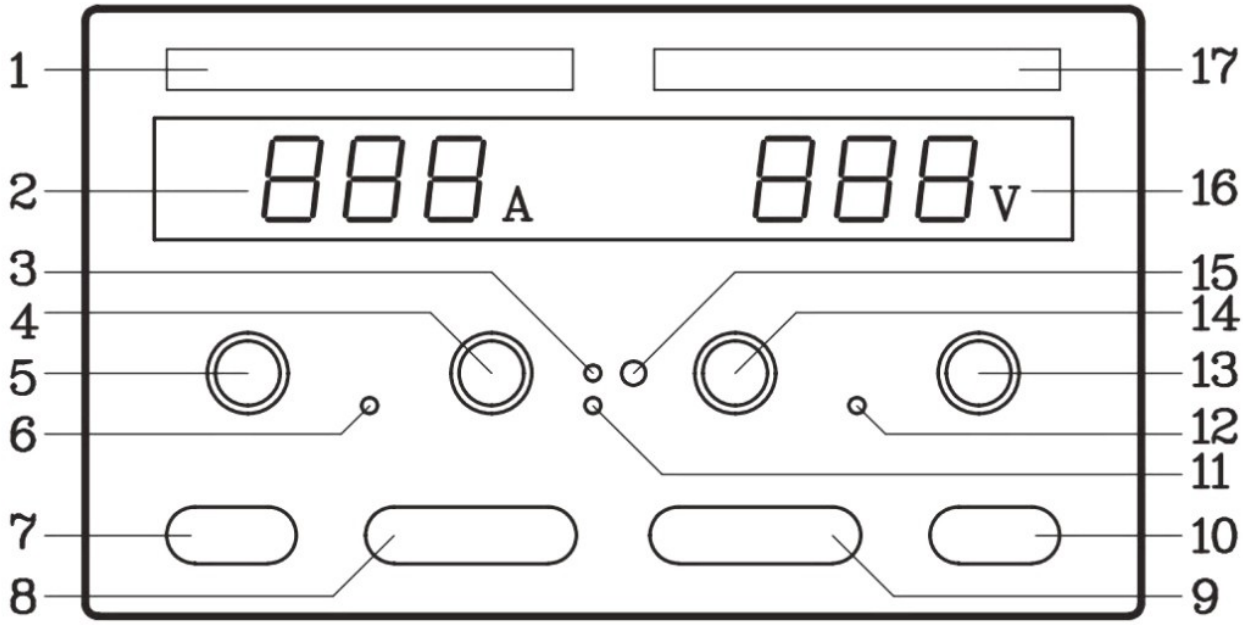
If a mechanic switch is used to connect or disconnect the power supply output, electric discharge will occur during switching. This may cause instability to the output. To prevent such situations, connect a RC circuit to the switch contact point.



3. Installation and Connection

1. The power supply will generate heat during operation. Before operation, the power supply should be placed in an environment with good ventilation. Avoid places of great heat, high humidity & temperature or heavy dust.
2. Allows sufficient ventilation space at the front and rear panels. A ventilation distance between the power supply and other equipments should be at least 300mm. Avoid overlapping with other equipments.
3. The magnetic field generated from the power supply can have influence to nearby devices. Please place devices which are sensitive to magnetic field away from the power device.
4. Choose suitable AC input wire according to the rated power of the power supply.
5. Choose suitable DC output wire according to rated power of the power supply to connect the load.
6. Devices of the DP-S series are not designed for 100% duty cycle and have to cool down every 25 – 35 minutes for 15 minutes if the load is over 4kW. If the OT led switches on the device is in “CoolDown” mode. Switch off the output and wait 15 minutes.

4. Panel Introduction



No.	Name	Description
1	Name label	Original DSC-Electronics Logo
2	Ammeter	Displays the output current.
3	OTP indicator	The indicator lights on if the Over Temperature Protection is activated, or the device is in „CoolDown“ mode. Switch off the output and let the device cool down for 15 minutes.
4	Current set	Coarse regulation of the output current.
5	Current fine set	Fine regulation of the output current.
6	CC indicator	The indicator lights on if the power supply is under constant current operation mode.
7	Power switch	Press to power on/off the power supply.
8	Connection 1	(Optional)
9	Connection 2	(Optional)
10	Output ON/OFF	Output ON/OFF switch.
11	OVP indicator	The indicator lights on if the Over Voltage Protection is activated.
12	CV indicator	The indicator lights on if the power supply is under constant voltage operation mode.
13	Voltage set	Coarse regulation of output voltage.
14	Voltage fine set	Fine regulation of output voltage.
15	OVP setting knob	Used to set the value of over voltage protection. Leave at max. or set it with a small screwdriver if needed.
16	Voltmeter	Displays the output voltage.
17	Model	Shows model number and output range of the DP-S.

5. Operation Instructions

5.1 Over Voltage Protection

NOTE: The OVP Setting shuts down the output, if the preset OVP voltage value is reached. This is useful for general protection of the load.

Setting the OVP:

1. Connect the power supply to local power source.
2. Press the power switch [7] to turn on the power supply.
3. Switch on the output by pressing Output ON/OFF [10].
4. Tune the over voltage setting knob [15] and current knob [4] clockwise to the maximum.
5. Tune voltage knob [13, 14] to the necessary value of OVP.
6. Tune the over voltage knob [15] anti-clockwise until the OVP indicator [11] lights on. Now the power supply shuts down output.
7. Switch OFF the power supply [7].
   The OVP is now set.

   NOTE: The output voltage should be less than the OVP setting value. Otherwise, the power supply is in OVP mode and the output will always be shut down. If no specific OVP needed, leave the setting at max.

Resetting the OVP:

1. If you have set an OVP value, it can be canceled as per the following steps:
2. Tune the over voltage setting knob (15) clockwise to the maximum.

5.2 Constant Voltage Setting

NOTE: Connect the load always before turning on the output, but after turning on the power supply. Always wait after switching on the DP-S until the switch-on pulse is discharged (See voltage indicator), before making any adjustments or connect a load.

1. Connect the power supply to local power source.
2. Press the power switch [7] to turn on the power supply.
3. Switch on the output by pressing Output ON/OFF button [10].
4. Set the Current Knobs [4, 5] clockwise to the maximum.
5. Tune knobs [13, 14] to the necessary voltage value.
6. Switch off the output by pressing Output ON/OFF button [10].
7. Connect the load to output terminals [18, 19].
8. Switch on the output [10].
   The power supply can be used for work now.
   The CV indicator [12] will light on, which means the output voltage is constant, while the output current changes according to load capacity.

5.3 Current limit

NOTE: Connect the load always before turning on the output, but after turning on the power supply. Always wait after switching on the DP-S until the switch-on pulse is discharged (See voltage indicator), before making any adjustments or connect a load.

1. Connect the power supply to local power source.
2. Press the power switch [7] to turn on the power supply.
3. Switch on the output by pressing Output ON [10].
4. Tune voltage knob [13] to 5V.
5. Tune current knob [4, 5] to the minimum.
6. Switch off the output by pressing Output ON/OFF [10].
7. Use a test lead to short the two main terminals [18, 19].
8. Switch on the output by pressing Output ON [10].
9. Tune current knobs [13, 14] to the necessary current value.
10. Switch off the output by pressing Output OFF [10].
11. Disconnect the test lead.
12. The Current limit is now set.

5.4 Constant Current Mode

NOTE: Connect the load always before turning on the output, but after turning on the power supply. Always wait after switching on the DP-S until the switch-on pulse is discharged (See voltage indicator), before making any adjustments or connect a load.

1. Connect the power supply to local power source.
2. Press the power switch [7] to turn on the power supply.
3. Switch on the output by pressing Output ON [10].
4. Tune the over voltage setting knob [15] clockwise to the maximum.
5. Tune voltage knob [13] to the desired max. value.
6. Tune current knob [4, 5] to the minimum.
7. Switch off the output by pressing Output ON/OFF [10].
8. Use a test lead to short the two main terminals [18, 19].
9. Switch on the output by pressing Output ON [10].
10. Tune current knobs [4, 5] to the necessary current value.
11. Switch off the output by pressing Output ON/OFF [10].
12. Connect the load to output terminals [18, 19].
13. Switch on the output by pressing Output ON [10].

The CC indicator [6] will go on, which means the output current is constant, while the output voltage changes according to load capacity. If the CC indicator [6] is not on, increase the load capacity, change the constant current value or raise the max. voltage to reach a constant current.

5.5 External analog Voltage and Current control (Optional)

The Device can be equipped with a 0-5V external analog control for output Voltage (Connection2) and Current (Connection 1).

Voltage and Current Control:

To control the output Voltage or Current of the DP-S, please connect the control Signal (0-5V) to the (SIG) and the (GND) connections. Use the (V+) connection as a power supply for external control circuits (5.1V 0.5W Max.). Now switch the device to EXT mode.

6. Maintenance

The following instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.

1. Inspect the instrument at regular intervals so that it maintains its initial performance for a long time.
2. Check the input power cord for damage. Check the terminal screws and binding posts for loosening.
3. Remove dust from the inside of the casing and ventilation holes of the cover by using compressed air or a vacuum cleaner.

6.1 Cleaning

1. Before cleaning, disconnect the AC mains.
2. To clean the power supply, use a soft cloth dampened in a solution of mild detergent and water. Do not spray cleaner directly onto the instrument, since it may leak into the case and cause damage.
3. Do not use chemicals containing benzene, benzene, toluene, xylene, acetone, or similar solvents.
4. Do not use abrasive cleaners on the instrument.